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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/768,039	02/02/2004	Miho Watanabe	118506	6320

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EXAMINER
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OLSEN, ALLAN W

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 05/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/768,039

Applicant(s)

WATANABE ET AL.

Examiner

Allan Olsen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-87 is/are pending in the application.
- 4a) Of the above claim(s) 1-15, 31-39 and 58-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-30 and 40-57 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/2/04; 6/1/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election with traverse of Group II claims 16-31, 33-40 and 67-74 in the reply filed on March 16, 2006 is acknowledged. The traversal is on the grounds that the process of making the product cannot make a linear structure as asserted by the Office because the claimed method recites, "to thereby form a mesh structure of the carbon nanotubes structure. This is found persuasive. However, the inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the claimed product (mesh of cross-linked carbon nanotubes) could be formed by depositing non-functionalized nanotubes on a base body, forming a mesh of noncross-linked carbon nanotubes and then providing functional groups and crosslinking the carbon nanotubes.

The requirement is still deemed proper and is not made final.

With respect to the election of species requirement, applicant provisionally elected with traverse "claim 2 of Species Set I, claim 7 of Species Set II, and claim 8 of Species Set III". Applicant states, "the election of species appears irrelevant with respect to the claims of Group II. The Group II claims are generic to all of the species." The examiner disagrees. Although the species were identified by citing claims that belong to group I, the same species are

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identically recited in group II as well. Specifically, group II claims 31, 34, 36, 58, 61, 63 and those dependent thereon, are directed to nonelected species.

Claims 1-15, 32 and 67-87 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions and claims 31, 33-39 and 58-66 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on March 16, 2006.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**Claims 16-19, 27-30, 40-46 and 53-57 are rejected under 35 U.S.C. 102(b) as being anticipated by US Patent Application Publication 2002/0008956 (hereinafter, Niu).**

Niu teaches forming a structure comprising crosslinked carbon nanotubes. See the following excerpts.

[0078] Nanofiber networks may be prepared with or without surface

treatment and in various structural forms, i.e. aggregates and mats, as

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described below. Preferably they are treated to introduce chemical functional groups onto their surfaces. After filtration, washing and drying, the functionalized carbon nanotubes are dispersed in water and then filtered to yield a carbon nanofiber mat. After drying and cross-linking, a rigid carbon nanotube electrode is formed.

[0108] The electrodes may also comprise nanofibers in the form of a rigid porous structure comprising intertwined carbon nanofibers. The rigidity of the nanofibers are improved by causing the nanofibers to form bonds or become glued with other nanofibers at the fiber intersections. The bonding can be induced by chemical modifications of the surface of the nanofibers to promote bonding, by adding "gluing" agents and/or by pyrolyzing the nanofibers to cause fusion or bonding at the interconnect points.

[0111] Nanofibers may be used in the electrochemical capacitors of the invention in various geometries. They may be present as dispersed fibrils, as aggregates or as mats or films.

[0128] The specific capacitance of nanotube electrodes can be further increased by surface modification. Advantageously, the nanofibers are functionalized nanofibers, i.e. nanofibers whose surfaces are uniformly or non-uniformly modified so as to have a functional chemical moiety associated therewith. The nanofiber surfaces may be functionalized by reaction with oxidizing or other chemical media. The nanofiber surfaces may be uniformly modified either by chemical reaction or by physical adsorption of species which themselves have a chemical reactivity. The nanofiber surfaces may be modified e.g. by oxidation and may be further modified by reaction with other functional groups. The nanofiber surfaces may be

modified with a spectrum of functional groups so that the nanofiber can be chemically reacted or physically bonded to chemical groups in a variety of substrates.

[0129] Complex structures of nanofibers may be obtained by linking functional groups on the fibrils with one another by a range of linker chemistries.

[0130] Functionalized nanofibers and methods of making them are set forth in United States patent application Ser. No. 08/352,400 filed on Dec. 8, 1994 for FUNCTIONALIZED NANOTUBES, hereby incorporated by reference.

[0133] The nanofibers are preferably functionalized nanofibers which broadly have the formula

[C.sub.nH.sub.LR.sub.m

[0134] where n is an integer, L is a number less than 0.1 n, m is a number less than 0.5 n,

[0135] each of R is the same and is selected from SO.sub.3H, COOH, NH.sub.2, OH, O, CHO,

[0160] A network of carbon nanofibers are produced by contacting carbon fibrils with an oxidizing agent for a period of time sufficient to oxidize the surface of the carbon nanofibers, contacting the surface-oxidized carbon nanofibers with reactant suitable for adding a functional group to the surface of the carbon nanofibers, and further contacting the surface-functionalized nanofibers with a cross-linking agent effective for producing a network of carbon nanofibers. A preferred cross-linking agent is a polyol, polyamine or polycarboxylic acid.

[0161] The functionalized nanofibers may also be in the form of rigid networks

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of nanofibers. A well-dispersed, three-dimensional network of acid-functionalized nanofibers may, for example, be stabilized by cross-linking the acid groups (inter-fibril) with polyols or polyamines to form a rigid network.

[0162] The nanofiber particles also include three-dimensional networks formed by linking functionalized nanofibers of the invention. These complexes include at least two functionalized nanofibers linked by one or more linkers comprising a direct bond or chemical moiety.

It is noted that the limitations of claims 27, 30 and 53-57 are taught in US patent application 08/325,400 (now US Patent 6,203,814), which Niu incorporates by reference in paragraph [0130]. For example, columns 18 and 19 of the '814 patent include the following:

Activation of carboxylic acids for amination with primary amines occurs through the N-hydroxysuccinamyl ester; carbodiimide is used to tie up the water released as a substituted urea. The NHS ester is then converted at RT to the amide by reaction with primary amine.

0.242 g of chlorate-oxidized fibrils (0.62 meq/g) was suspended in 20 ml anhydrous dioxane with stirring in a 100 ml RB flask fitted with a serum stopper. A 20-fold molar excess of N-Hydroxysuccinimide (0.299 g) was added and allowed to dissolve. This was followed by addition of 20-fold molar excess of 1-ethyl-3-(3-dimethylaminopropyl)-carbodiimide (EDAC) (0.510 g), and stirring was continued for 2 hr at RT. At the end of this period stirring was stopped, and the supernatant aspirated and the solids were washed with anhydrous dioxane and MeOH and filtered on a 0.45 micron polysulfone membrane. The solids were washed with additional MeOH on the filter membrane and vacuum-dried until no further weight reduction was observed. Yield of NHS-activated oxidized fibrils was 100% based on the 6% weight gain observed.

**Claims 16-19, 27-29 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent Application Publication 2004/0101634 of Park et al. (hereinafter, Park).**

Park teaches forming a film of functionalized carbon nanotubes. Park teaches exposing portions of the film to UV radiation, thereby cross-linking the functionalized carbon nanotubes forming and then dissolving away the non-exposed, non-cross linked region of the film thereby creating a patterned cross-linked film.

**Claims 16-19, 27-29, 40-46 and 53-56 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by US Patent Application Publication 2002/0122765.**

See, for example, paragraphs [0106] and [0137].

**Claims 16-19, 27-30, 40-46 and 53-57 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by US Patent Application Publication 2005/0064647.**

The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

**Claims 16-30 and 40-57 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by US Patent Application Publication 2005/0040371.**

The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allan Olsen whose telephone number is 571-272-1441. The examiner can normally be reached on M-F 1-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Allan Olsen', is positioned to the left of the printed name and title.

Allan Olsen  
Primary Examiner  
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